IN THE CLAIMS

1. (Original) A computer-implemented method of designing the geometrical size of a hydraulic element in a hydraulic system composed of hydraulic elements; the method having access to:

a geometrical parameter representing geometrical size and shape of the hydraulic element and a flow resistance parameter representing flow resistance properties of the hydraulic element;

a numerical representation of simulated measures of the flow;

wherein the numerical representation of the hydraulic system is open to changes in a calculated flow capacity through changes in a value of the flow resistance parameter;

the method comprising the steps of:

simulating measures of the flow at discrete instances of time and at discrete instances of space of the hydraulic system;

regulating a calculated value of the flow capacity in response to a design criterion by adjusting the flow resistance parameter to obtain a regulated value of the flow capacity; and

calculating the value of a geometrical size of the hydraulic element from the regulated value of the flow capacity and a specified flow resistance parameter.

2. (Original) A method according to claim 1, wherein the flow resistance parameter comprises roughness of the material of the hydraulic element.

3. (Currently Amended) A method according to claim 1 ~~or 2~~, wherein the value of the geometrical size is calculated from the specified value of the flow resistance parameter, a value of the regulated value of the flow capacity, and specified geometrical shape and slope of the hydraulic element.

4. (Original) A method according to claim 3, wherein the hydraulic element is a pipe or channel and the value of the geometrical size (A;R) is calculated from the specified geometri

cal shape (A,R) of the pipe or channel, a specified roughness parameter (M), a specified geometrical slope (S) of the pipe or channel, and the regulated value of the flow capacity (Q) in accordance with the following equation:

$Q = MAR^{2/3}\sqrt{s}$

where:

Q is the flow capacity,

M is Manning's number which represents the roughness of the material of the inside wall of the pipe or channel,

A is the cross-sectional flow area of the pipe or channel,

R is the hydraulic radius of the pipe or channel,

S is the pipe slope of the pipe or channel;

the method having access to a procedure for determining the cross-sectional flow area and the hydraulic radius based on the size and shape of the pipe or channel.

5. (Original) A method according to claim 1, wherein a simulated measure of the flow is selected from the group of: level of a fluid in the hydraulic element and/or flow rate of the fluid in the hydraulic element and/or pressure in the hydraulic element.

6. (Original) A method according to claim 1, wherein the value of the flow resistance parameter is regulated during simulations by means of a simulated PID (Proportional, Integral and Differential) regulator strategy.

7. (Original) A method according to claim 1, wherein the value of the flow resistance parameter is regulated in response to the difference between a value of the selected simulated measure and the design criterion in the form of a predefined threshold value.

8. (Original) A method according to claim 1, wherein the step of regulating a calculated value of the flow capacity is performed over a finite period of time; and

wherein the step of regulating the calculated value is reiterated with the regulated value of the geometrical size, if a design criterion is not fulfilled.

9. (Original) A method according to claim 1,
wherein the step of simulating measures is performed over a series of finite length; and
wherein the step of calculating a value of the geometrical size is performed when the step of simulating measures over the series of finite length has elapsed.

10. (Original) A method according to claim 1, wherein the hydraulic system is of at least one of the following groups:

- Wastewater systems
- Storm drainage systems.
- Combined sewer systems
- Wastewater treatment facility hydraulic systems.
- Irrigation systems.

11. (Original) A method according to claim 1, wherein the numerical representation is a dynamic, one-dimensional model based on the solution of the Saint-Venant equations.

12. (Original) A computer-readable medium for making a computer execute the following method when run on a computer; the method having access to:

a geometrical parameter representing geometrical size and shape of the hydraulic element and a flow resistance parameter representing flow resistance properties of the hydraulic element;

a numerical representation of simulated measures of the flow;

wherein the numerical representation of the hydraulic system is open to changes in a calculated flow capacity through changes in a value of the flow resistance parameter;

the method comprises the steps of:

simulating measures of the flow at discrete instances of time and at discrete instances of space of the hydraulic system;

regulating a value of the flow resistance to obtain a regulated value of the flow capacity; and

calculating the value of a geometrical size of the hydraulic element from the regulated value of the flow capacity and a specified flow resistance parameter.

13. (Original) A computer-implemented method of designing the geometrical size of a hydraulic element in a hydraulic system composed of hydraulic elements; the method having access to:

a geometrical parameter representing geometrical size and shape of the hydraulic element and a flow resistance parameter representing flow resistance properties of the hydraulic element;

a numerical representation of simulated measures of the flow;

wherein the numerical representation of the hydraulic system is open to changes in a calculated flow capacity through changes in a value of the flow resistance parameter;

the method compring the steps of:

simulating measures of the flow at discrete instances of time and at discrete instances of space of the hydraulic system; and

regulating a value of the flow resistance to obtain a regulated value of the flow capacity;

calculating the value of a geometrical size of the hydraulic element from the regulated value of the flow capacity and a specified flow resistance parameter.

14. (Original) A computer system for designing the geometrical size of a hydraulic element in a hydraulic system composed of hydraulic elements; the system comprising:

a data storage with a geometrical parameter representing geometrical size and shape of the hydraulic element and a flow resistance parameter representing flow resistance properties of the hydraulic element, and a numerical representation of simulated measures of the flow; wherein the numerical representation of the hydraulic system is open to changes in a calculated flow capacity through changes in a value of the flow resistance parameter;

simulator arranged to simulate measures of the flow at discrete instances of time and at discrete instances of space of the hydraulic system, a regulator arranged to regulate a value of the flow resistance to obtain a regulated value of the flow capacity, and a converter arranged to calculate a value of a geometrical size of the hydraulic element from the regulated value of the flow capacity and a specified flow resistance parameter.

15. (New) A method according to claim 2, wherein the value of the geometrical size is calculated from the specified value of the flow resistance parameter, a value of the regulated value of the flow capacity, and specified geometrical shape and slope of the hydraulic element.